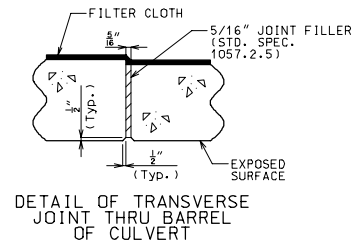
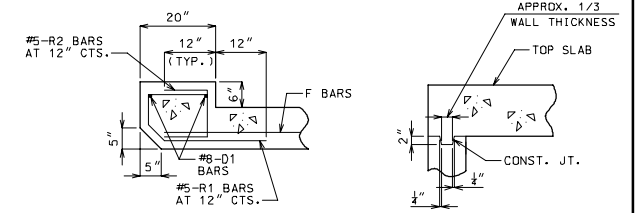


HALF PLAN HALF HORIZONTAL SECTION

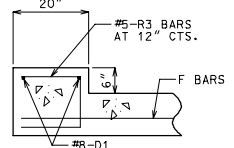


DETAIL OF TRANSVERSE JOINT THRU BARREL OF CULVERT



SECTION A-A

DETAIL OF KEYED CONST. JT.



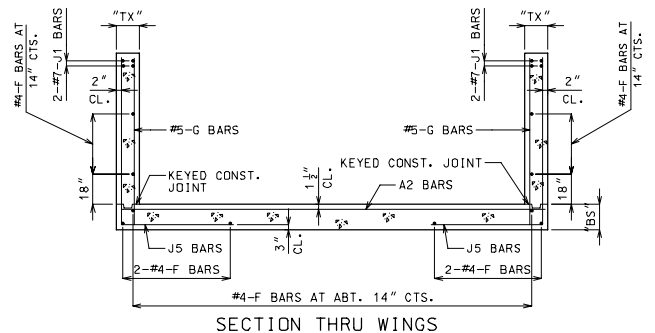
SECTION B-B

GENERAL NOTES:

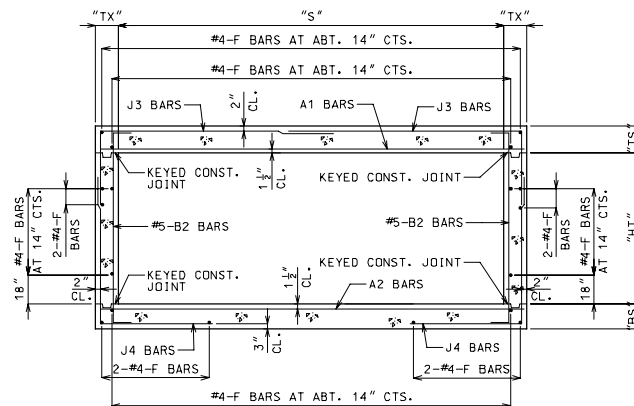
- ALL DIMENSIONS SHOWN ARE IN INCH UNLESS OTHERWISE NOTED.
- FOR DIMENSIONS AND SIZE AND SPACING OF REINFORCING STEEL, SEE STANDARD SHEET 703.15C.
- LAP ALL LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.
- MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1-1/2" UNLESS OTHERWISE SHOWN.
- JOINT FILLER SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH NO. 10 GAGE COPPER WIRE OR NO. 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.
- BEVELED HEADWALL TO BE LOCATED AT UPSTREAM END.
- A FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE APPLIED TO ALL TRANSVERSE JOINTS IN THE TOP SLAB AND SIDEWALLS. THE MATERIAL SHALL BE CENTERED ON THE JOINT AND THE EDGES SEALED WITH A MASTIC OR WITH TWO SIDED TAPE. THE FILTER CLOTH SHALL BE A GEOTEXTILE MEETING THE APPROVAL OF THE ENGINEER AND HAVING A GRAB TENSILE STRENGTH OF 180 LBS. (ASTM D-4632) AND AN APPARENT OPENING SIZE OF 50 TO 100 (ASTM D-4751). NO DIRECT PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING FILTER CLOTH.
- FOR MORE DETAILS AND SECTION THROUGH BOX, SEE 703.10E SHEET 2 OF 3.

- UPSTREAM = 3'-5" DOWNSTREAM = 4'-0"
 - IF MORE THAN ONE TRANSVERSE JOINT IS REQUIRED, SEE STANDARD SHEET 703.12E FOR DETAILS.
 - FOR DETAILS AND REINFORCEMENT IN WINGS, SEE STANDARD SHEET 703.37B.
 - USE THESE BARS FOR DESIGN FILLS OF MORE THAN 2'-0".
 - USE THESE BARS FOR DESIGN FILLS OF 2'-0" OR LESS.
- (**) VARIES - 12" MAXIMUM
- (***) USE TRANSVERSE JOINT WHEN BARREL IS OVER 80 FEET LONG BETWEEN HEADWALLS.
- USE ADDITIONAL TRANSVERSE JOINTS TO PROVIDE 50 FEET MAXIMUM SPACING BETWEEN JOINTS.
- DISTANCE BETWEEN INSIDE FACE OF HEADWALL AND TRANSVERSE JOINT SHALL NOT BE LESS THAN 3'-0".
- (****) J4 BAR SPACING

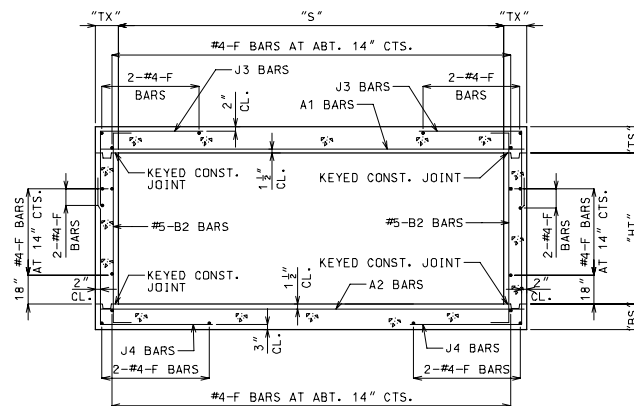
MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION			
CONCRETE SINGLE BOX STRUCTURE STRAIGHT WINGS (SQUARE)			
DATE: _____	EFFECTIVE: 01-01-2003	703.10E	1/3



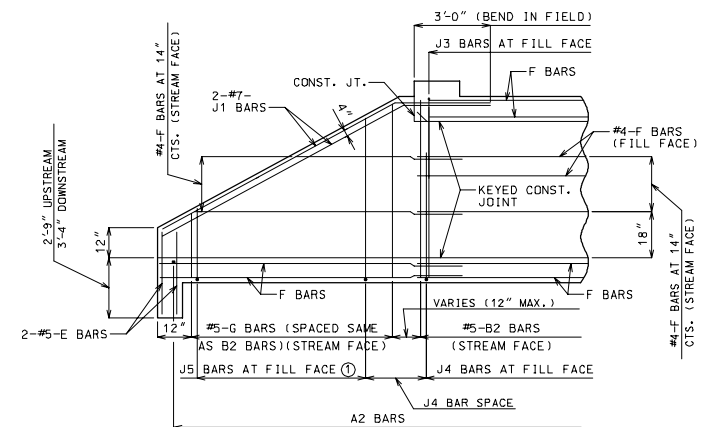
SECTION THRU WINGS



SECTION THRU BOX (DESIGN FILLS 2'-0" OR LESS)



SECTION THRU BOX (DESIGN FILLS OVER 2'-0")



ELEVATION OF WING
(UPSTREAM SHOWN)

NOTE: CONSTRUCTION JOINT KEY OMITTED FOR CLARITY.

GENERAL NOTES:

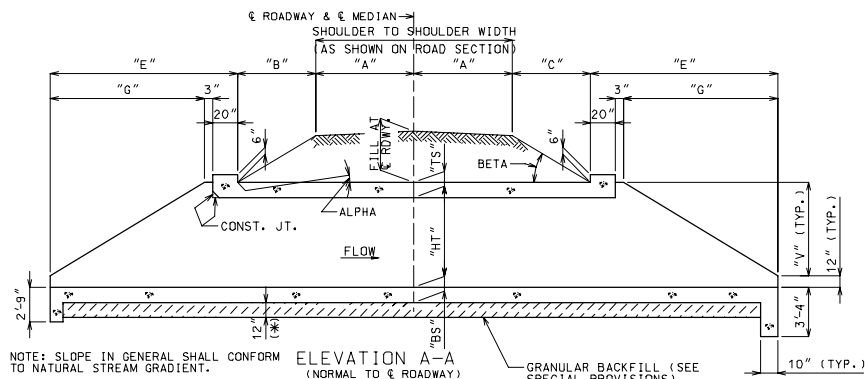
ALL DIMENSIONS SHOWN ARE IN INCH UNLESS OTHERWISE NOTED.
J1 BARS MAY BE BENT IN FIELD OR SHOP.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1-1/2" UNLESS OTHERWISE SHOWN.

FOR DIMENSIONS AND SIZE AND SPACING OF REINFORCING STEEL, SEE STANDARD SHEET 703.15C.

① FOR DETAILS OF REINFORCEMENT IN WINGS, SEE STANDARD SHEET 703.37B.

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION			
CONCRETE SINGLE BOX STRUCTURE STRAIGHT WINGS (SQUARE)			
DATE: _____	EFFECTIVE: 01-01-2003	703.10E	2 3



GENERAL DATA TABLE	
VARIABLE	DIMENSION (In.)
ALPHA	SEE EQUATIONS
BETA	SEE EQUATIONS
"B"	SEE EQUATIONS
"C"	SEE EQUATIONS
"E"	$G + 23"$
"F"	$S + 2TX$
"G"	2V
"L"	$2A + B + C + 2E$
"V"	$HT + TS - 12"$

GENERAL NOTES:

DESIGN SPECIFICATIONS:
AASHTO 1996
LOAD FACTOR DESIGN

DESIGN UNIT STRESSES:
CLASS B-1 CONCRETE $f'c = 4,000 \text{ psi}$
REINFORCING STEEL (GRADE 60),
 $f_y = 60,000 \text{ psi}$

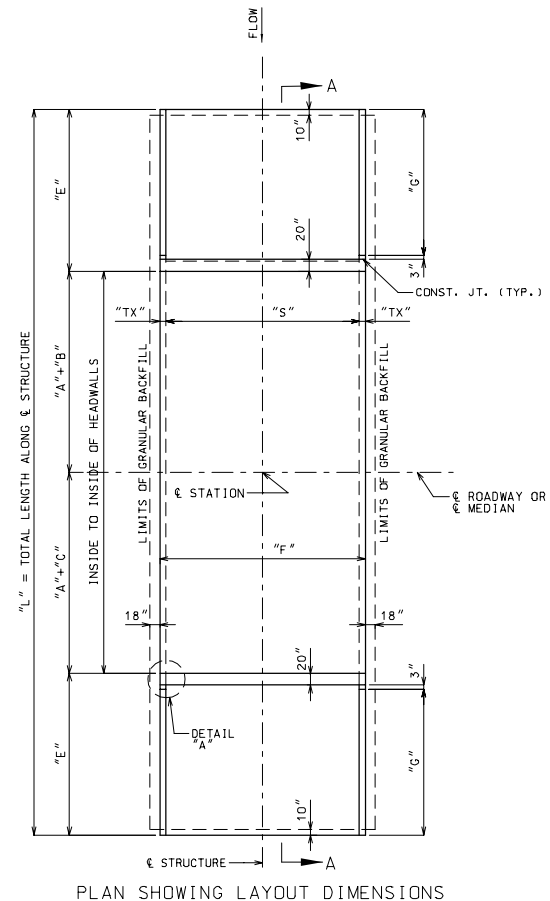
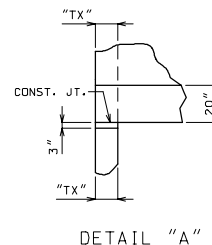
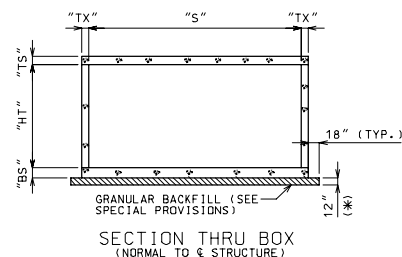
DESIGN LOADING:
EARTH 120 #/ft.^2
EQUIVALENT FLUID PRESSURE
 30 #/ft.^2 (MIN.) - 60 #/ft.^2 (MAX.)

ALL DIMENSIONS SHOWN ARE IN INCHES
(In.) UNLESS OTHERWISE NOTED.

THIS DRAWING IS NOT TO SCALE.
FOLLOW DIMENSIONS.

FOR DIMENSIONS NOT SHOWN, SEE
STANDARD SHEETS 703.10E, SHEETS
1 & 2 OF 3 OR 703.15C.

NOTE:
WHEN ALTERNATE PRECAST BOX SECTIONS ARE USED, THE MINIMUM BARREL
LENGTH MEASURED ALONG THE SHORTEST WALL FROM THE FIRST JOINT TO
THE OUTSIDE OF THE HEADWALL SHALL BE 3'-2". REINFORCEMENT AND
DIMENSIONS FOR THE WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH
MISSOURI STANDARD PLANS DRAWINGS.



EQUATIONS FOR COMPUTING LENGTH OF BARRELS

LET ALPHA = ANGLE OF SLOPE OF BARREL WITH HORIZONTAL ALONG
OF CULVERT.

LET BETA = ANGLE OF SLOPE OF FILL NORMAL TO ROADWAY.

"B" OR "C" = $(\text{FILL AT } \angle \text{ ROADWAY}) \div (\text{CROSS-SLOPE}) \times "A" \pm \tan(\text{ALPHA})$
 $\tan(\text{BETA}) \pm \tan(\text{ALPHA})$

"B" OR "C" = HORIZONTAL DISTANCE FROM EDGE OF SHOULDER TO
HEADWALL NORMAL TO OF ROADWAY.

DEFINITIONS

CROSS-SLOPE: SLOPE OF EACH PART OF THE ROADWAY INCLUDING
ROADWAY CROWN, SHOULDER SLOPE, AND/OR SUPERELEVATION.
SEE DESIGN ROADWAY CROSS SECTION FOR LANE AND SHOULDER
WIDTHS AND SLOPES.

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

CONCRETE SINGLE BOX STRUCTURE STRAIGHT WINGS (SQUARE)

DATE: _____

EFFECTIVE: 01-01-2003

703.10E

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